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097040,825	03/18/98	FRYBERG	M ICH275

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EXAMINER	
YAMNITZKY, M	
ART UNIT	PAPER NUMBER

1774

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/040,825

Applicant(s)

Mario FRYBERG et al.

Examiner

M. Yamnitzky

Group Art Unit

1774



☐ Responsive to communication(s) filed on _____.

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire three (3) month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-11 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-11 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☒ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 2 and 5

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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1. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Proper antecedent basis is lacking for "said coatings" as recited in lines 2-3 of claim 1.

Proper antecedent basis is lacking for "the layers" as recited in claims 2-4. While the recording sheet might comprise more than one layer on a support, the recording sheet is not required to have more than one layer. It is not clear if claims 2-4 and claims dependent therefrom are requiring more than one layer.

Proper antecedent basis is lacking for "the molecular weight" and for "the polymer" as recited in claim 5.

Antecedent basis for the molecular weight range of "20 000 to 150 000" is not found in the specification as this range is not set forth in the specification. (The range could be added to the specification without introducing new matter since the range was set forth in an original claim.) Further, the molecular weight limitation renders claim 5 indefinite because it is not specified how the molecular weight is determined (e.g. is the molecular weight a number average molecular weight or a weight average molecular weight?).

Claim 7: The scope of polymers or copolymers derived from acrylic acid derivatives is not clear. Do derivatives of the derivatives bear any resemblance to acrylic acid?

Proper antecedent basis is lacking for "the crosslinking agent" as recited in claims 8-10.

In line 2 of claim 8, "epoxydes" should read --epoxides--.

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Claim 9 does not utilize proper Markush language. The term --consisting-- should be inserted between "group" and "of".

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 4, 8 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Smigo et al. (5,281,307).

Smigo et al. disclose a paper coated with a polyvinyl alcohol/vinyl amine copolymer containing between 0.5 and 25 mole% vinylamine units, preferably 2 to 12 mole% vinylamine units. The copolymer may be made by copolymerizing vinyl acetate with N-vinylamides such as N-vinyl formamide or N-vinyl acetamide, following by hydrolysis of the vinyl acetate to vinyl alcohol and hydrolysis of the vinyl amide to vinylamine. A crosslinking agent may also be used to crosslink the copolymer. See the whole patent. In particular, see column 1, line 44 to c. 2, l. 22, c. 4, l. 61 to c. 5, l. 25, c. 6, l. 8-20, c. 6, l. 36-60 and Examples 1-5.

Although Smigo et al. do not disclose the coated paper as a "recording sheet for ink jet printing" and do not disclose the coating as a layer "receptive for aqueous inks", the present claim terminology of "recording sheet for ink jet printing" and "receptive for aqueous ink" indicates the intended use of the claimed coated support. Absent a showing to the contrary, it is the examiner's

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position that the prior art coated paper is capable of functioning as a recording sheet for ink jet printing and the prior art's coating of crosslinked polyvinyl alcohol/vinyl amine copolymer is receptive for aqueous inks since the prior art's coating has the same composition as the ink receptive layer of the present invention. Because the prior art meets the structural and compositional limitations of the rejected claims, the prior art anticipates the rejected claims.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, 3, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smigo et al. (5,281,307) as applied to claims 1, 4, 8 and 11 above, and for the further reasons set forth below.

Smigo et al. apply the copolymer in dry end addition to cellulosic based materials. In the background discussion, Smigo et al. teach that various other additives such as starch, carboxy methyl cellulose, polyvinyl alcohol and polyacrylic emulsions are common dry end additives (c. 1, l. 55 to c. 2, l. 10). It would have been an obvious modification to one of ordinary skill in the art at the time of the invention to include one or more of the commonly employed additives disclosed by Smigo et al. in combination with the copolymer. One of ordinary skill in the art would have

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been motivated to use other commonly employed additives for the properties afforded by those additives.

6. Claim 5 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Smigo et al. (5,281,307) as applied to claims 1, 4, 8 and 11 above, in view of Oliver et al. (5,270,103).

In the examples of the Smigo patent, a fully hydrolyzed, "medium molecular weight," water soluble copolymer from Air Products and Chemicals is used. Whether a copolymer having a "medium molecular weight" would have a molecular weight within the range of 20,000 to 150,000 as required by present claim 5 is not certain, though the examiner notes that the present specification discloses that usable copolymers are available from Air Products & Chemicals, Inc. (p. 16, lines 13-14).

At column 6, lines 21-36 of the patent to Oliver et al., polyvinyl alcohol polymers available from Air Products are described in terms of number average molecular weight. Polymers having a number average molecular weight of 85,000-146,000 are referred to as polymers with a "medium number average molecular weight" (c. 6, l. 34-35). Although the polyvinyl alcohol polymers of the Oliver patent are not the same as the vinyl alcohol/vinyl amine copolymers of the Smigo patent, it is the examiner's position that it is reasonable to expect that the "medium" molecular weight copolymers from Air Products which are used by Smigo et al. would have a molecular weight similar to the "medium" molecular weight polymers from Air

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Products which are described by Oliver et al, in which case the copolymers used in the examples of the Smigo patent have a molecular weight within the scope of present claim 5.

Alternatively, and absent a showing of criticality for the molecular weight of the copolymer, it is the examiner's position that it would have been within the ordinary skill of a worker in the art at the time of the invention to determine usable and optimum molecular weights for the copolymer based on factors affected by molecular weight such as viscosity.

7. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smigo et al. (5,281,307) as applied to claims 1, 4, 8 and 11 above, and further in view of Kobayashi et al. (5,910,359).

In column 6 of the Smigo patent, various crosslinking agents such as epoxy resins and aldehydes are disclosed. Smigo et al. do not explicitly disclose the crosslinking agents required by present claims 9 and 10, but Smigo et al. further teach that "other crosslinking agents commonly employed for poly(vinyl alcohol)" may be used to crosslink the vinyl alcohol/vinyl amine copolymers.

Kobayashi et al. disclose various crosslinking agents which may be used for crosslinking water-soluble resins such as polyvinyl alcohol. The crosslinking agents disclosed by Kobayashi et al. include aldehydes, epoxy resins, and triazine derivatives such as 2,4-dichloro-6-dihydroxy-s-triazine (s-triazine is 1,3,5-triazine as required by present claim 10).

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Absent a showing of criticality for a particular crosslinking agent, it is the examiner's position that it would have been within the ordinary skill of a worker in the art at the time of the invention to select from crosslinking agents known to be usable for crosslinking polyvinyl alcohol, as directed by Smigo et al.; with crosslinking agents within the scope of present claims 9 and 10 being known to be usable for crosslinking polyvinyl alcohol as demonstrated by the patent to Kobayashi et al.

8. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kono et al. (4,801,497) or Kashiwazaki et al. (5,747,146), either of these patents in view of Smigo et al. (5,281,307).

Kono et al. and Kashiwazaki et al. disclose recording media for ink jet printing comprising a support and at least one ink-receptive layer. Both of these patents teach the use of cationically modified polyvinyl alcohol in an ink-receptive layer.

Kono et al. disclose the use of cationically modified polyvinyl alcohol wherein the cationic group is present in the polymer in an amount between 0.05 and 20 mole percent. The cationically modified polyvinyl alcohol is used in combination with one or more other polymers. See the whole patent. In particular, see the abstract, column 4, lines 11-18, c. 4, l. 59 to c. 6, l. 16 and c. 7, l. 35-53.

Kashiwazaki et al. disclose the use of cationically modified polyvinyl alcohol as a binder in an ink-receptive layer wherein the cationic group is preferably present in the cationically modified

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polyvinyl alcohol in an amount between 0.05 and 30 mole percent, more preferably between 0.1 and 10 mole percent. The cationically modified polyvinyl alcohol may be used in combination with one or more other water-soluble resins and/or water dispersible resins. See the whole patent. In particular, see column 5, line 35 to c. 6, l. 29 and c. 7, l. 8-29.

Neither Kono et al. nor Kashiwazaki et al. explicitly disclose a copolymer of the general structure set forth in present claim 1, although such a copolymer is within the scope of each patent's cationically modified polyvinyl alcohol which is a polyvinyl alcohol having a cationic group such as a primary, secondary, or tertiary amino group, or a quaternary ammonium group. The copolymer required by the present claims is a polyvinyl alcohol having a primary or secondary amino group. The mole percent range for the cationic groups as disclosed by Kono et al. (0.05 to 20 mole percent) encompasses the relative amount of vinyl amine units required by the present claims ($y = 0.05$ to 0.2 , which is 5 to 20 mole percent). Kashiwazaki et al. also disclose a mole percent range (0.05 to 30) which encompasses the presently claimed range for y . Both patents disclose a preferable range (0.1 to 10) which overlaps the presently claimed range for y .

Smigo et al. disclose a paper coated with a polyvinyl alcohol/vinyl amine copolymer containing between 0.5 and 25 mole% vinylamine units, preferably 2 to 12 mole% vinylamine units. The copolymer may be made by copolymerizing vinyl acetate with N-vinylamides such as N-vinyl formamide or N-vinyl acetamide, following by hydrolysis of the vinyl acetate to vinyl alcohol and hydrolysis of the vinyl amide to vinylamine. A crosslinking agent may also be used to crosslink the copolymer. See the whole patent. In particular, see column 1, line 44 to c. 2, l. 22,

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c. 4, l. 61 to c. 5, l. 25, c. 6, l. 8-20, c. 6, l. 36-60 and Examples 1-5. The copolymers disclosed by Smigo et al. are polyvinyl alcohols containing amino groups, and are inherently cationic.

Smigo et al. teach using the copolymers to coat paper and paper-type products in order to provide improvements in properties such as dry strength, wet strength and fold resistance.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the copolymers disclosed by Smigo et al. as the cationically modified polyvinyl alcohol used in the recording medium of Kono et al. or Kashiwazaki et al. One of ordinary skill in the art would have been motivated to do so by the fact that the copolymers taught by Smigo et al. meet Kono's and Kashiwazaki's requirements for the cationically modified polyvinyl alcohol including the mole percent requirements for the cationic group, and by Smigo's teachings regarding the improved properties provided by using the copolymer. One of ordinary skill in the art would recognize that the improved properties taught by Smigo et al. would be beneficial with respect to a recording medium for ink jet printing.

The molecular weight range required by present claim 5 is considered to be *prima facie* obvious in view of the teachings in the Kono patent and the Kashiwazaki patent regarding preferred degrees of polymerization for the cationically modified polyvinyl alcohol.

9. Document 21 (EP 0445327A1) listed on page 1 of 2 of the PTO-1449 filed 06/10/99 has not been considered because the document is not in the English language and no statement of relevance for the document was included in the IDS.

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The present specification discloses numerous references, many of which are listed on the PTO-1449 filed 06/10/99, but the examiner does not find mention of EP 0445327A1. If the examiner has overlooked citation of this document in the present specification, applicants are requested to identify the page and line numbers at which this document is disclosed and the examiner will list the document on a PTO-892.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Tsuk et al. (3,609,132) disclose cationic water soluble vinyl alcohol/vinyl amide copolymers used in paper making to enhance retention of pigment particles. The copolymers comprise from 70-95 mole percent vinyl alcohol units. Tsuk et al. teach that at less than 70 mole percent vinyl alcohol, cost increases without substantially increasing cationic behavior, and at more than 95 mole percent vinyl alcohol units, cationic activity is insufficient for the purpose of aiding retention.

Pinschmidt, Jr. et al. (5,300,566) disclose methods for making copolymers containing 50-99 mole percent of vinyl alcohol units and 1-50 mole percent of vinyl amine units (c. 2, l. 29-42). In the background discussion, Pinschmidt et al. teach that amine containing polymers are a cost effective way of incorporating cationic charge into polymers and have a variety of uses including as coatings, adhesives and binders (c. 1, l. 27-44).

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Suzuki et al. (5,620,793) also disclose the use of cationically-modified polyvinyl alcohol in a coating for paper useful for ink jet printing. For example, see c. 3, l. 13-28 and c. 3, l. 59 to c. 4, l. 10.

11. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (703) 308-4413. The examiner can generally be reached at this number from 6:45 a.m. to 3:15 p.m. Monday-Friday.

The current fax numbers for Art Unit 1774 are (703) 305-3599 for official after final faxes and (703) 305-5408 for all other official faxes. (Unofficial faxes for Art Unit 1774 can be sent to (703) 305-5436.)

MRY
07/17/99

Marie R. Yamnitzky

MARIE YAMNITZKY
PRIMARY EXAMINER

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